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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/040,469	01/09/2002	David B. Layzell	1998-016-08US	2590

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EXAMINER

GELLNER, JEFFREY L

ART UNIT	PAPER NUMBER
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3643

DATE MAILED: 03/31/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,469

Applicant(s)

LAYZELL ET AL.

Examiner

Jeffrey L. Gellner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 and 24-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18, 19 and 24-27 is/are rejected.
- 7) ☒ Claim(s) 17, 20 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. §102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 18, and 19 are rejected under 35 U.S.C. §102(b) as being anticipated by Spencer (US 1,677,153).

As to Claim 1, Spencer discloses a method of enhancing plant growth (page 1 lines 1-4) comprising treating soil (page 2 lines 54-60) with hydrogen gas (“air” of page 2 lines 50-53; air defined as inherently containing hydrogen gas, as per, Applicant’s remarks in paper no. 13, page 9, 1st complete para.) at a concentration greater than the concentration of hydrogen gas in air (“20 pounds to as high as 80 pounds” of page 3 col. 1 lines 48-51 in that as measured on the basis of volume the conc of hydrogen would be greater) and growing a plant in the soil (see Fig. 1).

As to Claim 2, Spencer further discloses combining the soil treated with hydrogen (defined as soil lying below the truck cab in Fig. 1) with soil not treated with hydrogen gas (defined as soil surround tree 23 in Fig. 1), and growing a plant (23 of Fig. 1) in the combined soil.

As to Claim 3, Spencer further discloses the treated soil between 5 and 100%, by volume (Examiner estimates that 50% of the soil in Fig. has been treated).

As to Claim 4, Spencer further discloses a plant growing (Fig. 1).

As to Claim 5, Spencer further discloses a plant that is planted in soil not treated (23 of Fig. 1) adjacent a volume of soil treated (soil under truck's cab in Fig. 1).

As to Claim 6, Spencer further discloses that the soil treated is soil in which the plant is already growing (page 2 lines 104-113).

As to Claim 18, Spencer further discloses the hydrogen gas provided to the soil via tubing or hollow probes placed in the soil (17 of Fig. 1).

As to Claim 19, Spencer further discloses the hydrogen gas enhancing the ability of soil microorganisms to oxidize hydrogen (more hydrogen in the "air" of the soil would inherently cause the organisms present to use or oxidize the hydrogen and to select for genotypes more capable of using hydrogen); and wherein the enhanced ability of the soil microorganisms potentiates enhanced growth of plants (generally, more "air" in soil would enhance microbe growth which would generally enhance plant growth).

Claims 1, 9-12, 16, 24, and 25 are rejected under 35 U.S.C. §102(b) as being anticipated by Nelson (document 5 under Other Publications on Applicant's 1449).

As to Claims 1, 9-12, 24, and 25, Nelson discloses a method of enhancing plant growth ("At higher irradiance, there were indications that shoot yield and N levels were enhanced by inoculation with Hup- isolates (Fig. 1 and Table 1)" at page 861 last paragraph) comprising treating soil (in that the plants are placed in the soil and would give off hydrogen gas) with hydrogen gas (inherent with use of Hup- strains) at a concentration greater than the concentration of hydrogen gas in air (Fig. 1 since hydrogen is evolved), and growing a plant in the soil (from Material and Methods).

As to Claim 16, Nelson further discloses placing the soil in a container that minimizes the diffusion of hydrogen gas (in that plants were grown in a growth chamber which would imply growing plants in pots).

Claims 1-3, 5-8 are rejected under 35 U.S.C. §102(b) as being anticipated by Yoshida (US 4,758,318).

As to Claim 1, Yoskida discloses a method of enhancing plant growth (col. 1 lines 29-36) comprising treating soil (Fig. 1; abstract) with hydrogen gas (gas would be created by the electrical current in the soil) at a concentration greater than the concentration of hydrogen gas in air (in that any generation of hydrogen gas by the electrical current would add to the hydrogen in the ambient air) and growing a plant in the soil (see Fig. 1).

As to Claim 2, Yoskida further discloses a the plant growing in treated in not treated soil (not shown but roots of plant would extend the electrodes in Fig. 1).

As to Claim 3, Yoskida further discloses the treated soil at 100% (Fig. 1).

As to Claim 5, Yoskida further discloses a plant in soil not treated (any plant growing outside of Fig. 1 would be in untreated soil adjacent to treated soil).

As to Claim 6, Yoskida further discloses the soil treated after the plant is already growing (col. 1 lines 59-63).

As to Claim 7, Yoskida further discloses hydrogen gas generated by electrolysis of water (inherent in Fig. 1 to the soil water in Fig. 1).

As to Claim 8, Yoskida further discloses an electrical current in the soil (abstract).

Claim Rejections - 35 USC §103

The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 26 and 27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Spencer (US 1,677,153).

As to Claim 26, the limitations of Claim 1 are disclosed as described above. Not disclosed is the concentration of hydrogen gas 50 times greater than the concentration in air. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Spencer by increasing the pressure of the air (page 3 col. 1 lines 51-61) so as to use the method effective in soil with low porosity so as to enhance soil characteristics in these type of soils.

As to Claim 27, Spencer as modified further discloses increasing the hydrogen concentration as the treatment progresses (inherent at page 3 col. 1 lines 51-55).

Claims 13-15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Spencer (US 1,677,153).

As to Claim 13, the limitations of Claim 11 are disclosed as described above. Not disclosed is the legume with inefficient nitrogen-fixing bacteria. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Nelson by

having the legume with inefficient fixing-fixing bacteria depending upon the exact combination of variety of crop/strain of bacteria which would depend upon the goal desired.

As to Claim 14, the limitations of Claim 11 are disclosed as described above. Not disclosed is the legume with distributed nodulation. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Nelson by having the legume with distributed nodulation depending upon the exact combination of variety of crop/strain of bacteria which would depend upon the goal desired.

As to Claim 15, the limitations of Claim 11 are disclosed as described above. Not disclosed is the legume with enhanced number of nodules. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Nelson by having the legume with enhanced number of nodules depending upon the exact combination of variety of crop/strain of bacteria which would depend upon the goal desired.

Allowable Subject Matter

Claims 17, 20, and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments filed 19 December 2003 have been fully considered but they are not persuasive. Applicant's arguments are: (1) Spencer does not specifically teach treating soil with hydrogen gas and the amount of hydrogen gas in air is too low to enhance plant growth

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(Remarks page 6 5th para.); (2) Spencer does not teach or suggest treating soil with hydrogen gas at a concentration greater than that of air (Remarks page 7 1st para.); and, (3) Eisbrenner et al. does not disclose enhancing plant growth with hydrogen gas production but rather enhancing plant growth by using HUP+ bacteria which do not produce hydrogen gas (Remarks page 7 last para.).

As to argument (1), Examiner considers that Spencer discloses treating soil with a combination of gases - those that make up air- and hydrogen is one of them. The plain language of Applicant's claims does not specifically claim a beneficial effect to the plant by hydrogen. The claim only goes to treating soil with hydrogen gas and growing plants in the soil. Spence discloses this method step regardless of how the beneficial effect come about.

As to argument (2), Examiner considers Spencer to disclose the method of treating soil with hydrogen gas at a concentration greater than its concentration in air because compressed air (as shown in Fig. 4) would have a relatively higher concentration on hydrogen on a volume basis. See the definition of concentration provided at page 238 of Merriam-Webster's College Dictionary.

As to argument (3), Examiner withdraws the rejection based on Eisbrenner et al.

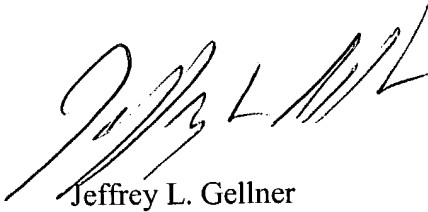
Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Jeffrey L. Gellner whose phone number is 703.305.0053. The Examiner can normally be reached Monday through Thursday from 8:30 am to 4:00 pm. The Examiner can also be reached on alternate Fridays.

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If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's Supervisor, Peter Poon, can be reached at 703.308.2574. The official fax telephone number for the Technology Center where this application or proceeding is assigned is 703.872.9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.308.1113.

A handwritten signature in black ink, appearing to read "Jeffrey L. Gellner", is written over the printed name.

Jeffrey L. Gellner